UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,306	04/25/2001	David John Benjamin Pearce	CM00620P	6704

7590	08/29/2006

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EXAMINER
WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
2626	

DATE MAILED: 08/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/830,306	PEARCE ET AL.
	Examiner	Art Unit	
	James S. Wozniak	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/1/2006*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6,7,9-13,15,16,18,19 and 21-30* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6,7,11-13,15,16,18,19 and 23-30* is/are rejected.

7)☒ Claim(s) *9,10,21 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>25 April 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   In response to the office action from 2/1/2006, the applicant has submitted a request for

continued examination, filed 6/1/2006, amending claims 1, 3, 13, 15, 27, and 29, while arguing

to traverse the art rejection based on the amended limitations *(Amendment, Pages 8-9)*. The

applicant's arguments have been fully considered but are moot with respect to the new grounds

of rejection in view of Jacobs et al *(U.S. Patent: 5,956,683)* and Jeon et al *(U.S. Patent:*

5,673,363).

Response to Arguments

2.   Applicant's arguments have been fully considered but they are not persuasive for the

following reasons:

With respect to **Claims 27 and 29**, the applicant argues that although Zingher (U.S.

Patent: 6,092,039) "does not directly teach against the use of redundant information, Zingher

does express a desire for speech communication via a narrow bandwidth channel, which is

contrary to the inclusion of additional redundant information" *(Amendment, Page 9)*. In

response, the examiner points out that low bandwidth speech communications is actually

achieved though the use of a specific mel-cepstrum feature vector (Col. 16, Lines 37-54) and not

the exclusion of redundant data. In fact, Zingher specifically recites the desirability of using

redundant speech data *(Col. 20, Lines 42-48)*. Thus, since Zingher teaches the use of redundancy in speech encoding and provides no negative teachings directed toward its use, Zingher does not teach away from the invention taught by Nahumi. Also, the inclusion of the teachings of Zingher in Nahumi provides the benefit of achieving speech recognition in a narrow bandwidth channel (Zingher, Col. 6, Lines 9-14) while providing necessary error correction taught by Nahumi *(Col. 1, Lines 44-57)* to overcome possible channel errors which can degrade speech recognition accuracy *(Zingher, suggested use of error correction in DSR, Col. 20, Lines 42-48)*.

Thus, claims 27 and 29 remain rejected under Nahumi *(U.S. Patent: 5,699,478)* in view of Zingher.

The dependent claims further limit rejected independent claims, and thus, also remain rejected.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   **Claims 1, 3, 13, 15, and 25-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs et al *(U.S. Patent: 5,956,683)* in view of Jeon et al *(U.S. Patent: 5,673,363)*.

With respect to **Claims 1, 3, 13, and 15**, Jacobs discloses a distributed speech recognition process in which speech recognition parameters are arranged in vectors *(extracted speech*

recognition feature vectors, Col. 5, Lines 22-43; and Col. 6, Lines 13-30), each vector

corresponding to a particular sampling time frame (feature vectors arranged in frames, Col. 6,

Lines 58-63) and the speech recognition parameters are received at a second location having

been transmitted from a first location (transmitting speech feature vectors to a remote location

over a communication channel, Col. 9, Lines 7-20).

Jacobs does not provide for any type of transmission error correction as is disclosed in

the presently claimed invention, however Jeon recites:

Identifying a group comprising one or more audio (speech in the case of Jacobs)

parameters which have undergone a transmission error (detecting an error in a received frame,

Col. 4, Lines 22-28); and

Replacing one or more parameters in the identified group, wherein one or more

parameters are replaced by respective replacement parameters corresponding to parameters from

a different time frame, received without error after the identified error group (utilizing

coefficients from a future frame without error to reconstruct a detected error frame, Col. 4, Line

62- Col. 5 Line 2; and Col. 6, Lines 20-26).

Jeon further discloses that the reconstruction coefficients are closet in receipt order to the

error-containing frame (coefficients from a contiguous frame used for error-containing frame

reconstruction, Col. 6, Lines 20-26 and Lines 58-63).

Jacobs and Jeon are analogous art because they are from a similar field of endeavor in

audio encoding. Thus, it would have been obvious to a person of ordinary skill in the art, at the

time of invention, to modify the teachings of Jacobs with the transmission error correction means

taught by Jeon in order to conceal errors of an error-containing frame while minimizing its

influence on succeeding frames *(Jeon, Col. 6, Lines 58-63)*.

With respect to **Claims 25 and 26**, Jacobs further discloses a wireless communication

channel *(Fig. 2; and Col. 5, Lines 22-43)*.

5.   **Claims 4 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs

et al *(U.S. Patent: 5,956,683)* in view of Jeon et al *(U.S. Patent: 5,673,363)*, and further in view

of Ozawa *(U.S. Patent: 5,305,332)*.

With respect to **Claims 4 and 16**, Jacobs in view of Jeon teach the error correction

system and method that conceals errors by replacing speech parameters from a error-containing

frame with speech parameters from a closest frame, as applied to Claims 3 and 15. Jacobs in

view of Jeon do not specifically suggest a well-known method for error recovery using

interpolation, however Ozawa teaches such a method *(interpolating pitch and filter parameters*

from past and future proper frames to correct transmission errors, Col. 4, Lines 7-12).

Jacobs, Jeon, and Ozawa are analogous art because they are from a similar field of

endeavor in speech parameter coding. Thus, it would have been obvious to a person of ordinary

skill in the art, at the time of invention, to modify the teachings of Jacobs in view of Jeon with

the use of interpolation in error recovery as taught by Ozawa in order to provide improved error

correction by using parameters from past and future frames *(Ozawa, Col. 6, Lines 32-40)*.

6.   **Claims 6-7, 11-12, 18-19, and 23-24** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Jacobs et al *(U.S. Patent: 5,956,683)* in view of Jeon et al *(U.S. Patent:*

5,673,363), and further in view of Yeldener et al *(U.S. Patent: 5,774,837)*.

With respect to **Claims 6 and 18**, Jacobs in view of Jeon teach the error correction

system and method that conceals errors by replacing speech parameters from a error-containing

frame with speech parameters from future correct frames, as applied to Claims 1 and 13.   Jacobs

in view of Jeon teach do not teach the method of error detection through comparison of a speech

estimate to a threshold, however Yeldener discloses:

An error mitigating method and apparatus, wherein determination of which speech

recognition parameter or parameters are to be replaced is performed by predicting fro vectors

received without error, a predicted value for each speech recognition parameter within the

identified group of vectors, and replacing those speech recognition parameters within the

identified group of vectors that are outside of a predetermined threshold relative to their

respective predicted value *(comparing an estimated pitch value of a frame to previous values to*

detect a variation in a speech signal indicative of an error, Col. 13, Lines 37-50).

Jacobs, Jeon, and Yeldener are analogous art because they are from a similar field of

endeavor in audio parameter coding.   Thus, it would have been obvious to a person of ordinary

skill in the art, at the time of invention, to combine the method of estimating a pitch value and

comparing it to a threshold for error detection as taught by Yeldener with the teachings of Jacobs

in view of Jeon teach in order to provide a means of further error detection for frame smoothing

to improve the quality of reproduced speech *(Yeldener, Col. 13, Lines 37-50)*.

With respect to **Claims 7 and 19**, Yeldener teaches a means for changing parameters of a frame if one parameter does not satisfy a threshold condition, as applied to Claims 6 and 18.

Claims 11 and 23 contain subject matter similar to Claims 6 and 18, and thus, are rejected for the same reasons.

With respect to **Claims 12 and 24**, Yeldener teaches the subject matter applied to Claims 6 and 18, wherein an error is detected in a three frame period.

7.   **Claims 27-30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nahumi *(U.S. Patent: 5,699,478)* in view of Zingher *(U.S. Patent: 6,092,039)*.

With respect to **Claims 27 and 29**, Nahumi discloses:

Identifying a group comprising one or more vectors that have undergone a transmission error *(vector representation, Col. 6, Lines 1-21; and detecting a transmission error, Col. 6, Lines 36-58)*;

Replacing one or more speech parameters in the identified group of vectors, wherein he one or more parameters in the identified group of vectors are replaced by respective replacement parameters corresponding to one or more speech recognition parameters from a vector without error received after the identified group of vectors *(Col. 6, Line 59- Col. 7, Line 12)*.

Although Nahumi teaches an error recovery technique similar to that of the present invention, Nahumi does not teach the transmission of speech recognition vector parameters in a distributed speech recognition system, however Zingher teaches a vocoder for use in an automatic speech recognition system having a client and server *(Col. 5, Line 51- Col. 6, Line 13; and Fig. 6)*.

Nahumi and Zingher are analogous art because they are from a similar field of endeavor

in speech parameter coding. Thus, it would have been obvious to a person of ordinary skill in

the art, at the time of invention, to modify the teachings of Nahumi with the use of a vocoder in a

distributed speech recognition process to provide a practical application for the method of

Nahumi to achieve speech recognition in a narrow bandwidth channel (Zingher, Col. 6, Lines 9-

14) while providing necessary error correction taught by Nahumi *(Col. 1, Lines 44-57)* to

overcome possible channel errors which can degrade speech recognition accuracy *(Zingher,*

suggested use of error correction in DSR, Col. 20, Lines 42-48).

With respect to **Claims 27 and 29**, Nahumi in view of Zingher teaches the DSR system

featuring an error recovery means as applied to Claims 1 and 13. Additionally Zingher teaches

the use of mel cepstral coefficients as speech parameters *(Col. 5, Line 51- Col. 6, Line 13; and*

Fig. 6).

With respect to **Claims 28 and 30**, Zingher further recites:

Speech recognition parameters include logarithmic energy *(Col. 8, Lines 20-29).*

Allowable Subject Matter

8.   **Claims 9-10 and 21-22** are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims.

9.   The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claims 9 and 21**, the prior art of record fails to teach or specifically

suggest the combination of the comparison of mel cepstral speech vectors that are within a

predicted parameter value threshold to a set of reference vectors to find a best match vector and

then using that best match vector to replace a mel cepstral speech vector that fulfills an error

condition of being outside of a predicted parameter threshold with an error concealment system

for use in a distributed speech recognition system performed over a network that uses a vector

received after a detected error vector to determine the replacement best match vector.

Claims 10 and 22 further limit claims containing allowable subject matter, and thus, also

contain allowable subject matter.

Conclusion

10.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure:

Kanevsky et al *(U.S. Patent: 5,897,616)*- teaches a distributed speech recognition system

that utilizes mel-cepstral coefficients.

Barrett et al (U.S. Patent: 5,917,835)- teaches a method for error frame concealment

using a following audio data frame.

11.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632.

The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David Hudspeth can be reached at (571) 272-7843. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
8/3/2006

- DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600